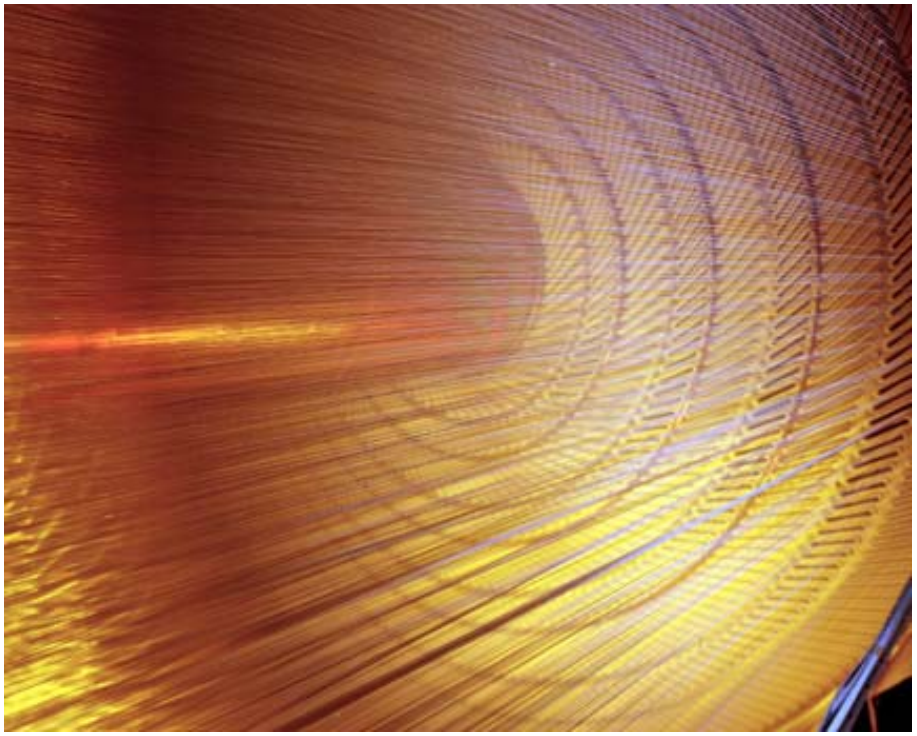
CDF Operations Report



Guram Chlachidze
JINR, Dubna/FNAL

All Experimenter's Meeting
December 5, 2005

System News

- Run IIb Stereo track trigger upgrade
  - Upgraded boards installation for the extremely fast tracker will be completed soon
  - Test of the modules are expected this week
- Silicon
  - Silicon Detector was switched off (cooling system was stopped temporarily) due to the power outage at CDF.
  - Chiller was swapped on Intermediate Silicon Layers.
  - Detector was powered up today, various tests are ongoing
- Online Computing
  - File server migration is completed, extensive tests of online software are ongoing
  - Upgrade to Linux 3.0.5: most software applications were successfully migrated and compiled
- CDF Safety system was checked

Access Report

CDF was in supervised access during the last week

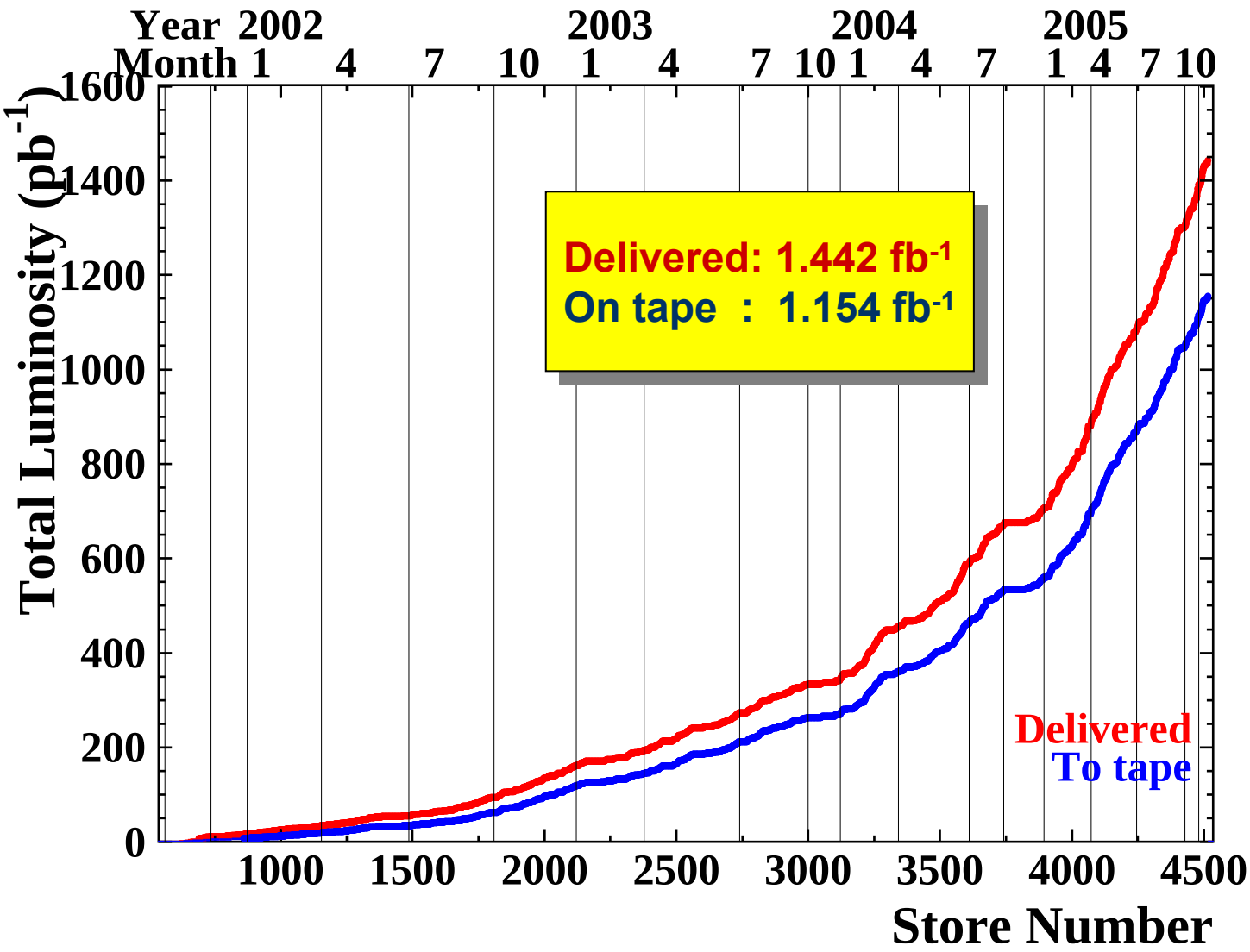
- Muon detectors
  - Noisy channels were isolated on north west and south east sectors of the Barrel Muon Upgrade (BMU), HV boards were replaced
  - Dead channel fixed on south east of the Barrel Scintillator Upgrade (BSU)
  - Malfunctioning counter was replaced on south east of the Toroid Scintillator Upgrade (TSU) detector
- Calorimeters
  - Noisy channels were fixed
  - Regular maintenance was done
- TDC for the Central Outer Tracker (COT)
  - Upgraded TDC were installed: 18+ out of 20 crates are equipped with modified TDC for the COT
  - Re-arranged boards in several crates, fixed or replaced bad boards
  - New TDC mezzanine cards were installed

Access Report

- Electrical work done to prepare the CDF Level-3 PC farm for additional CPUs
- Beam Luminosity Monitors (BLM)
  - Additional 2 polycrystalline CVD diamond Detectors were commissioned
  - Now 3 diamonds - prototypes for a fast beam abort system, are installed in total
- Plug Calorimeters
  - Radioactive source drivers were fixed, plug calorimeters re-calibrated

CDF operation plan is: to finish supervised access work as soon as possible and to bring the detector up by Thursday, December 8, 2005

Run II Integrated Luminosity (21 Nov.05)



Physics News: Top Mass Measurement

PRD paper using the template method was submitted in October 2005 (Best single measurement in the world) :

$$M_{top} = 173.5\ ^{+2.7}_{-2.6}\ (stat.) \pm 2.8\ (syst.)\ GeV/c^2$$

Reference comments were responded, acceptance expected soon

Today (12/05/2005) PRD paper was submitted:

Measurement of the Top Quark Mass with the Dynamical Likelihood Method (DLM) using Lepton plus Jets Events with b-tags in pp Collisions at $\sqrt{s}$ = 1.96 TeV

PRL paper with Template + DLM - Accepted on 11/29/2005

- No combination of results
- Template method is a primary result, DLM - a cross check
- Results are comparable

Top Mass Measurement with the DLM

DLM method was proposed in 1988

- *K.Kondo, J.Phys.Soc.Jpn 57, 4126 (1988)*

Latest formulations are described in:

- *K.Kondo, RISE Technical Report 05-01-2005, hep-ex/0508035*

DLM uses the differential cross section for the $t\bar{t}$ process as a function of M_{top} in the likelihood definition

Motivation:

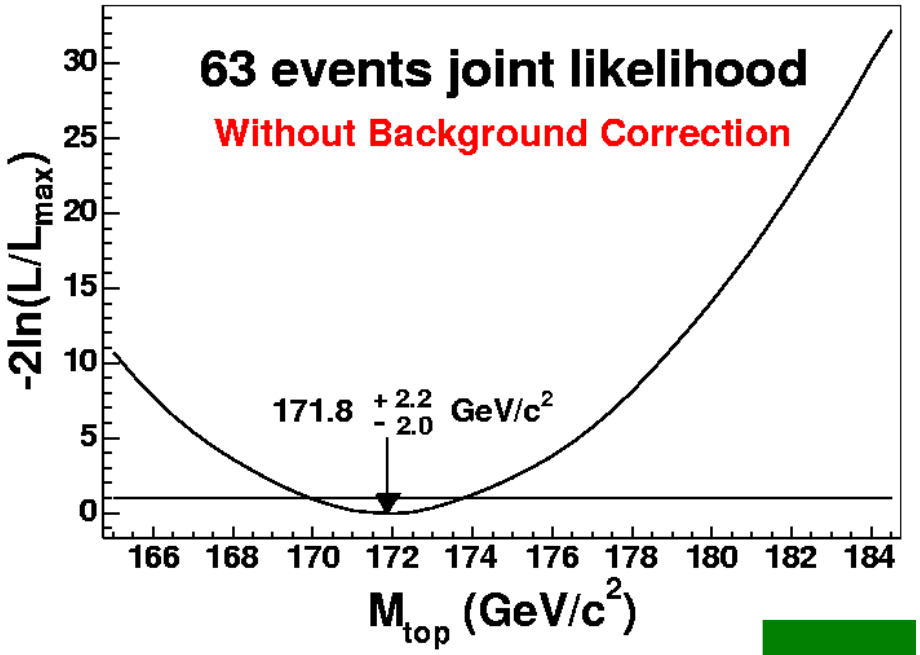
- Standard Model check,
- More information on the process is exploited,
- Needed for cross check.

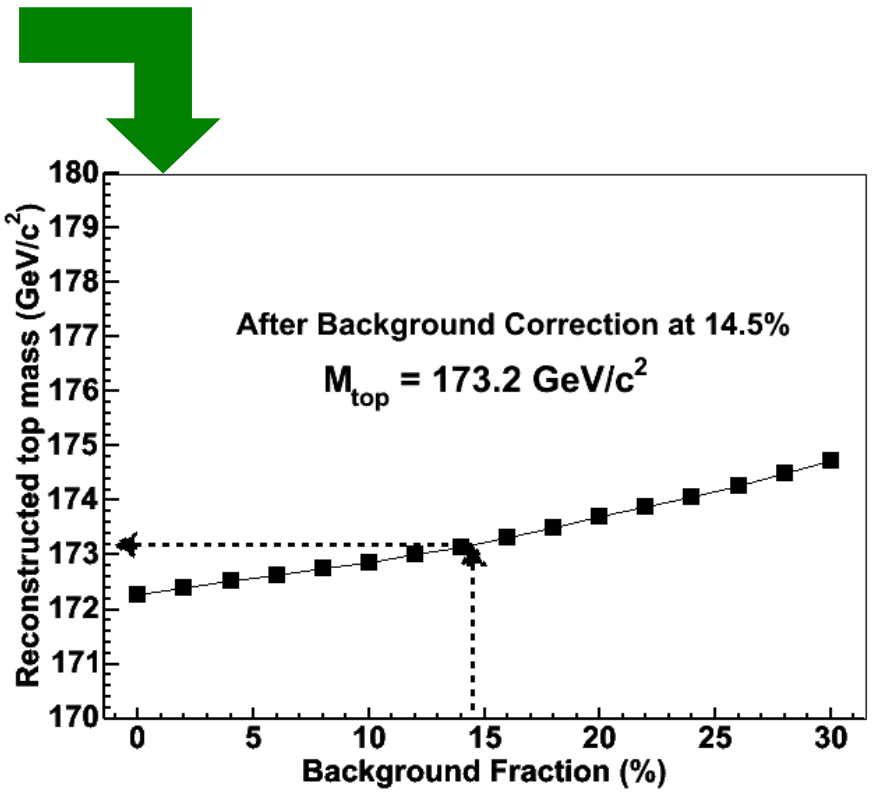
Data Sample: up to Summer 2004, 318 pb^{-1}

Event Selection : Standard Lepton + jets cuts

- Lepton with $E_t(P_t)$ >20 GeV and Missing Transverse Energy > 20 GeV
- Only events with exactly 4 tight jets E_t>15 GeV & pseudo-rapidity < 2.0
- Various veto : Z window, conversion, cosmic, dilepton
- At least one SECVTX (Secondary Vertex) b-tagged jet.

Top Mass Measurement with the DLM





$$M_{top} = 173.2\ ^{+2.6}_{-2.4}\ (stat.) \pm 3.2\ (syst.)\ GeV/c^2$$

Compare to the Template method result:

$$173.5\ ^{+2.7}_{-2.6}\ (stat.) \pm 2.8\ (syst.)\ GeV/c^2$$